

Leatherback Sea Turtle Meat and Eggs Consumption: Evaluation of Public Health Significance in Grenada, West Indies

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Abstract

The Leatherback sea turtle (*Dermochelys coriacea*) is known for traveling large distances and are at risk of being captured by fishermen. There are conservation efforts to protect the specie and health risks of ingesting or handling Leatherback sea turtle meat or eggs. This study applied a cross section approach using a survey and interview to assess consumption of leatherback sea turtle meat and eggs. In total 51 people were interviewed, 39 men and 12 women. 37% (19/51) reported that they had ingested turtle meat in the past, and 100% of them ate it fully cooked. 13% (7/51) ingested sea turtle eggs and 85% of time both turtle meat and eggs were fully cooked. The main reason described for the consumption was culture and accessibility of turtles although the practice is illegal. This study confirmed the practice of leatherback turtle meat and eggs consumption and identified reasons for this practice.

Introduction

The Leatherback sea turtle (*Dermochelys coriacea*) is known for traveling large distances and is the only remaining species of the *Dermochelys* genus [1]. They have been known to travel over 10,000 miles in one year in order to stay in warmer climates and to look for food (Sea Turtle Migration). They choose long stretches of beaches in warmer climates to nest and lay their eggs, one of which being Grenada. While the turtles are laying their eggs, they can become at risk from predators, but also from anthropogenic activity. They are at risk of being taken advantage of, having their habitat destroyed, having artificial light interrupt their laying process, and from the contamination of plastic and other trash [2]. These reasons listed are a major influence factor as to why these animals are on the International Union for Conservation of Nation's Red List as venerable and the Endangered Species list in the United States

(Leatherbacks). Due to this status, more conservation efforts need to be implemented all year long, and not only during the nesting season since it is known that after the season is complete, some remain close by and are at risk of being captured by fishermen [3].

Leatherback sea turtles are important to factor to include in more conservation efforts, because they are directly beneficial to Grenada. As of 2013, Grenada attributed 18% of the gross domestic product (GDP) to Industry, which accounts for the country's tourism and is an important source of income for the country [4]. In the nesting season, many tourists and students of St. George's University (SGU) like to participate in trips to Levera Beach to witness the female turtles come out of the ocean and find the perfect spot to lay their eggs. There are even student groups who volunteer to go and collect research and generate statistics based on the health of the

laying turtle, the number of eggs laid, and then from the bacterial present on the hatched eggshells. The collection of this information is helping create a baseline of information on how the turtles play a role in public health.

Public Health

Not much information has been gathered on the health risks of ingesting or handling Leatherback sea turtle meat or eggs in Grenada, two studies from Costa Rica found that *Salmonella* was a major potential risk for the turtles and for humans [1], and that a large role of hatchling success is based on the microbial and fungal varieties found in the sand inside the nesting hole [5]. In Mexico a study/survey was conducted to determine the public health safety and knowledge associated with the consumption of sea turtles. Their results showed that even physicians were not fully away of the exact possible side effects that could occur from turtle consumption, and that many people also would stop consuming it if they were told it was unhealthy [6].

In one study done in Grenada, the eggs were immediately swabbed for bacteria after they were laid, and sand samples were taken to see what bacteria was present. The results from this experiment found *Pseudomonas* spp. in abundance and many other pathogens [7]. The article then addressed how this is a public health issue due to the pathogens being “associated in humans with urinary tract infections, respiratory and gastrointestinal disease, wound infections, sepsis, and meningitis”. Another study points out that there is an added risk of getting heavy metal contamination from eating sea turtle meat. Some of the levels are higher than international food safety standards, and “could result in ... neurotoxicity, kidney disease, liver cancer, and developmental effects in fetuses and children” [8]. It was also found in a similar study that these affects can be seen throughout families due to an increase in sharing food [9].

People in Grenada are at risk of these outcomes mentioned previously due to the high prevalence of the local customs of ingesting the turtle meat and eggs, and even handling the eggs. The consequences of this practice could be severe diarrhea, severe dehydration that leads to hospitalization, and possibly toxic metal poisoning. Also, if common hand washing techniques are ignored in between handling the eggs and eating, there is a chance that bacteria will remain on the hands and it could cause that person to become infected by different bacteria. As seen by the Grenadian study, there is already an accumulation of some antimicrobial resistant bacteria found on the outer layer of the eggs and also in the surrounding sand [7]. These risks are literally right outside for some people living in coastal communities around Grenada.

Goal

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The main goal of this research project would be to lead to the cessation of consumption of leatherback sea turtle meat and eggs.

Methodology

Study design/procedures

This study design for this research was a cross sectional one using a structured survey and interview as its primary source of data.

Study implementation

For the parameters of the study the information was collected from the months of April 2017 to December 2019. Information was also collected by a third-party community-based groups that work in the region associated with leatherback nesting sites.

Study population

The study was given to randomly selected willing participants from local fishing communities around Grenada. These locations were chosen based on the proximity to the beaches where the turtles come up and make their nests, proximity to fishing communities, and the bus terminal due to the fact that people from all over the island use that public transport station.

Results

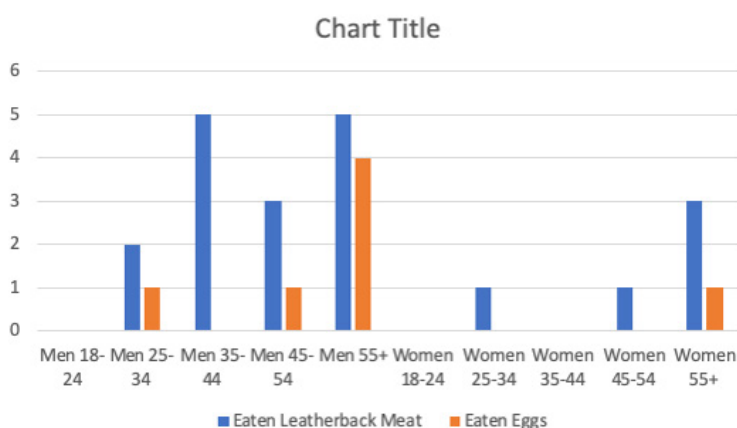
In total 51 people were interviewed, 39 men and 12 women. 90% (46/51) of the surveyed individuals have lived in Grenada their entire life, and predominantly most lived in St. George's parish (23/51) and St. John's (16/51) parish. 76% (39/51) knew about the Leatherback sea turtles and 20/51 believed that the turtles played a role in both food and the environment. 37% (19/51) told the interviewer that they had ingested turtle meat in the past, and 100% of them ate it fully cooked, only 13% (7/51) ingested sea turtle eggs and 85% of time they were also fully cooked. No one reported to getting sick after eating any turtle meat or eggs. The data showed that it was more common to have men partake in the consumption of either the eggs or meat, and there was also a spike correlating the older age groups and the amount of people who had participated, in both men and women. The main reason contributing to why ingested it was either because they liked it or due to the fact that it was a part of their culture growing up. No one disclosed needing to eat turtle meat or eggs because they had absolutely nothing else available. 19% of people knew about food borne illnesses related to *Salmonella* specifically and 45% knew that there were specific laws in Grenada pertaining to the time when sea turtles can be caught legally, and when it becomes illegal again. One of the last questions asked in the survey pertained to if the interviewee believed that the sea turtles helped the islands in any way, and 58% (30/51) agreed that they did have an added benefit to Grenada (Figure).

Discussion

Based on the information gained from doing this survey, it was seen that men would have eaten Leatherback sea turtles (meat/eggs) more commonly than women. In a few of the male interviews they mentioned that it was sometimes a way to prove how manly a person was. Not enough people brought this up to make it clinically significant, but that could also be linked in with their tradi-

tion. This may be an area to investigate further if the survey is ever repeated. It was more common to ingest turtle meat compared to the eggs and all of those who participated in this custom did not report any signs of being sick afterwards. There is still a possibility that individuals who handled the eggs/meat could still become carriers for bacteria like *Salmonella* species, which is a highly likely in reptiles [10]. When a person becomes a carrier, they can shed the bacteria at different times, sometimes for months, and if they do not have consistent hygiene practices then have the potential to contaminate others food and spread the illness. Carriers are the most difficult area to try and prevent because these people are asymptomatic and not currently experiencing any problems. Due to

the small sample size, repeating this survey in the future could potentially bring more information to light and could help make the Grenadian public aware of the risks associated with the consumption of turtle products and could also lead to better hand washing techniques and sanitary protocols [11-15]. Along with the survey, if participants were also given a handout on how to decrease the risk of getting ill as well as the benefits that the Leatherback's bring to Grenada then there would also be public education. Since one of the main reasons linked with consumption was due to cultural reasons, it might take more widespread educational talks that focus on the children and young adults in the areas on why the turtles are important to Grenada and how they should instead be protected [16].



Figure

Conclusion

This study described how common the practice of leatherback turtle meat and eggs consumption was amongst the Grenadian population and what the reasoning was behind it. For most people it was a part of their heritage, where some wanted to continue it and others had not participated in over 5 years; and for others it was just a food that they enjoyed eating. This paper does not pass any judgement, as the Grenadian people are free to participate in their own cultures and customs, but hopefully with added awareness on this issue of the Leatherbacks' being endangered they can focus on cultivating a lasting ecological difference in this species numbers.

Acknowledgement

None.

Conflict of Interest

No conflict of interest.

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